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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/668,938	09/25/2000	Volker Rasche	PHD99.130US	2720

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Corporate Patent Counsel
U S Philips Corporation
580 White Plains Road
Tarrytown, NY 10591

EXAMINER

KAO, CHIH CHENG G

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/668,938

Applicant(s)

RASCHE ET AL.

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-17 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5, 7, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitome (US Patent 5,751,782). Yoshitome discloses a method and device for acquiring a three-dimensional image data set of a periodically moving organ of the body of a patient, comprising the steps of:

an x-ray device which includes an x-ray source (Fig. 1, #11) and an x-ray detector (Fig. 1, #13),

detecting a motion signal which is related to the periodic motion of the body organ (Fig. 2, (a)) simultaneously with the acquisition of projection data sets (col. 7, lines 17-19),

successively acquiring the projection data sets required for the formation of a three-dimensional image data set from different X-ray positions, which x-ray positions are situated in one plane (Fig. 2, (c), and col. 2, lines 17-34),

controlling the X-ray device by means of the motion signal to acquire a projection data set during a low-motion phase of the body organ in each X-ray position required for the formation of the three-dimensional image data set (col. 7, lines 17-19, noting diastolic phase refers to the low-motion phase),

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using the projection data sets acquired during the low-motion phases for the formation of the three-dimensional image data set (col. 7, lines 64-66),

wherein only the projection data sets that have been acquired during the same motion phases are selected and used (Fig. 2, (a) and (b)),

wherein the various x-ray positions are successively occupied in an x-ray cycle (Fig. 4, "270" and "360"), that a plurality of x-ray cycles are successively completed (Fig. 4, "First rotation" and "Second rotation), and the X-ray device is controlled by means of the motion signal in such a manner that each X-ray cycle commences in a different phase of motion of the body organ (Fig. 4, start of "First rotation" and "Second rotation"),

wherein the x-ray device is controlled by means of the motion signal such that projection data sets are acquired only during low-motion phases of the body organ (col. 7, lines 17-19),

wherein the Xray device is controlled by means of the motion signal such that the X-ray source is switched on so as to acquire projection data sets exclusively during lowmotion phases of the body organ (col. 7, lines 48-51),

wherein a cardiac motion signal which is dependent on the motion of the heart is acquired as the motion signal (Fig. 2, "R" wave),

wherein the means for measuring the cardiac motion signal include one of: an electrocardiography device and a pulse oxymetry device (Fig. 1, #16).

However, Yoshitome does not seem to specifically disclose "irradiating the organ".

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to specifically have "irradiating the organ" with the method of Yoshitome,

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since "irradiating the organ" is considered conventional in the art. One would be motivated to irradiate the organ to acquire the image of the organ itself. Yoshitome discloses x-ray irradiation (col. 7, lines 7-8). Yoshitome also discloses acquiring the image of the organ (col. 10, lines 5-6). One would be motivated to irradiate the organ to acquire an image of the organ.

2. Claims 6, 8, 9, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitome as applied to claims 1, 7, and 12 above, and further in view of Van Horn et al. (US Patent 3,871,360). Yoshitome discloses a method and device as recited above. However, Yoshitome does not seem to specifically disclose

wherein a respiratory motion signal which is dependent on the patient's respiration is acquired as a motion signal,

wherein in addition to the cardiac motion signal there is acquired a respiratory motion signal which is dependent on the respiratory motion, and the respiratory motion signal is used to ensure that only the projection data sets that have been acquired during the same respiratory motion phases are used to form the three-dimensional image data set,

wherein the respiratory motion signal is used to correct, during the formation of the three-dimensional image data set, the projection data sets that have been acquired in different respiratory motion phases and the shifts in position of the body organ resulting therefrom,

wherein the means for measuring the motion signal are arranged to measure a respiratory motion signal which is dependent on the respiratory motion,

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wherein the means for measuring the respiratory motion signal include one of: an ultrasound device, an abdominal belt for measuring the motion of the diaphragm, and a resistance measuring device for measuring the resistance of the abdominal region of the patient.

Van Horn et al. teaches

wherein a respiratory motion signal which is dependent on the patient's respiration is acquired as a motion signal (Abstract),

wherein in addition to the cardiac motion signal there is acquired a respiratory motion signal which is dependent on the respiratory motion, and the respiratory motion signal is used to ensure that only the projection data sets that have been acquired during the same respiratory motion phases are used to form the three-dimensional image data set (col. 1, lines 24-30 and 43-53),

wherein the respiratory motion signal is used to correct, during the formation of the three-dimensional image data set, the projection data sets that have been acquired in different respiratory motion phases and the shifts in position of the body organ resulting therefrom (col. 5, lines 48-54),

wherein the means for measuring the motion signal are arranged to measure a respiratory motion signal which is dependent on the respiratory motion (Abstract),

wherein the means for measuring the respiratory motion signal include one of: an ultrasound device, an abdominal belt for measuring the motion of the diaphragm, and a resistance measuring device for measuring the resistance of the abdominal region of the patient (col. 2, lines 51-69).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the respiratory adaptations of Van Horn et al. with the method and device of Yoshitome, since one would be motivated to obtain images or measurements that are not blurred by heart or lung motion as shown by Van Horn et al. (col. 1, lines 24-29).

3. Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitome in view of Van Horn et al. as applied to claims 6, and 15 above, and further in view of Fujita (US Patent 5,482,042). Yoshitome in view of Van Horn et al. suggests a method and device as recited above. However, Yoshitome does not seem to specifically disclose

wherein the respiratory motion signal is used to inform the patient that a desired respiratory motion phase has been reached during which the acquisition of the projection data sets takes place,

wherein there is provided a signaling device for informing the patient that a desired respiratory motion phase has been reached.

Fujita teaches

wherein the respiratory motion signal is used to inform the patient that a desired respiratory motion phase has been reached during which the acquisition of the projection data sets takes place (col. 5, lines 52-58),

wherein there is provided a signaling device for informing the patient that a desired respiratory motion phase has been reached (Fig. 2).

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It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the respiratory signal for the patient of Fujita with the method and device of Yoshitome in view of Van Horn et al., since one would be motivated to have better user control for respiration to time data acquisition relative to breathing as shown by Fujita (col. 7, lines 33-67 and col. 8, lines 1-2).

Response to Arguments

4. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Regarding Yoshitome, spiral CT data is just another embodiment (col. 9, lines 57-62) where simultaneous rotation and linear movement is the object occurs. Secondly, periodic low motion phase of the organ corresponds to the diastolic phase of the heart.

Regarding Van Horn et al., the device is used for obtaining images in x-ray machines (col. 1, lines 5-10 and 24-30). It would have been obvious to one having ordinary skill in the art to incorporate the device of Van Horn et al. since it's related to x-ray machines.

Regarding Fujitsu, the claims 10 and 16 recite a type of indication means to the patient. It would have been obvious to one having ordinary skill in the art to combine the indication means of Fujitsu with the devices of Yoshitome and Van Horn, since one would be motivated to have better user control as explained above.

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Allowable Subject Matter

5. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Prior art does not specifically disclose or fairly suggest the method wherein the motion signal is used to control the x-ray device in such a manner that projection data sets are acquired from individual, selected x-ray positions, in combination with all the limitations in the claim and base claim.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - Th (8 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



gk
June 24, 2002



ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800